

REMARKS

The present Amendment amends claims 1 and 3-20, leaves claim 2 unchanged and adds new claims 21 and 22. Therefore, the present application has pending claims 1-22.

In paragraph 1 of the Office Action the Examiner states that the specification had not been checked to the extent necessary to determine the presence of all possible minor errors. Applicants have reviewed the specification and found no errors that required correction. The Examiner's cooperation is respectfully requested to identify any errors the Examiner may be aware of so that such errors can be quickly corrected so as to expedite prosecution of the present application.

Claims 1-20 stand rejected under 35 USC §102(e) as being anticipated by Yoshida (U.S. Patent Application Publication No. 2005/0050268). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1-20 are not taught or suggested by Yoshida whether taken individually or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Particularly, amendments were made to the claims to recite that the present invention is directed to a storage device control apparatus and a control method implemented in the storage device control apparatus.

The storage device control apparatus includes a plurality of channel control units, each with a host interface controller formed therein for receiving

data input/output (I/O) requests, a plurality of disk control units, each with a disk interface controller formed therein for performing I/O control of the data to storage volumes storing data in response to the data I/O requests, a plurality of cache memory units, each with a memory formed therein for temporarily storing data being transferred between the channel control units and the disk control units, and a plurality of storage control units, each with a host interface controller, a disk interface controller, and a memory formed therein, and an internal connection part which allows the channel control units, the disk control units, the cache memory units, and the storage control units to each be independently connected or disconnected to the storage device control apparatus in a communicable manner.

The control method implemented in the storage device control apparatus includes receiving the data I/O request at one of said storage control unit, referring to the information by the storage control unit to identify a unit to perform I/O control to a storage volume to which the data I/O request is directed, and performing the I/O control by the storage control unit when the unit to perform the I/O control is the one storage control unit, or letting another storage control unit perform the I/O control when the unit to perform the I/O control is not the one storage control unit. The control method the same as the storage device control apparatus provides that the internal connection part allows the channel control units, the disk control units, the cache memory units, and the storage control units to each be independently connected or disconnected to the storage device control apparatus in a communicable manner.

The above described features of the present invention as recited in the claims provides a storage device control apparatus 110 such as that illustrated, for example, in Figs. 2 and 7 and as discussed in the passages beginning on page 14, line 20 through page 17 line 6 and beginning on page 18, line 12 through page 19, line 22 that provides for each of the channel control units, the disk control units, the cache memory units, and the storage control units to be independently connected or disconnected to the storage device control apparatus. These features of the present invention as recited in the claims allows the overall system to be compact and to be highly scalable up or down as needed to meet the demands of small or large computer environments. Further, due to the independent nature of the connections of each of the units, failed units can be easily replaced as needed without affecting the operation of the system.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention as now more clearly recited in the claims are not taught or suggested by Yoshida whether taken individually or in combination with any of the other references of record.

Yoshida teaches a disk array control apparatus having a plurality of disk array control units for controlling data transfer between a plurality of host computers and a plurality of magnetic disk devices via a channel interface and a disk interface. Yoshida further teaches that the disk array control apparatus also includes an interconnection network for connection between shared

memory portions in the plurality of disk array control units and an interconnection network for connection between cache memories in the disk array control units so as to transfer control information concerning data transfer between the host computers and cache memories and management information of the magnetic disk devices from one of the disk array control units to another of disk array control units. This teaching of Yoshida allows for the apparatus to execute data processing while data transfer is performed from one of the disk array control units to another.

There is no teaching or suggestion in Yoshida of an internal connection part which allows the channel control units, the disk control units, the cache memory units, and the storage control units to each be independently connected or disconnected to the storage device control apparatus as in the present invention as recited in the claims.

In the Office Action the Examiner alleges that Yoshida teaches in Figs. 1-3 thereof a disk array control apparatus 1 having a plurality of disk array control units 1-2 each of which includes a disk I/F 12, a channel I/F 11, a cache memory 14, a shared memory 13 and interconnection networks 21, 22 for interconnecting the disk I/F 12, the channel I/F 11, the cache memory 14 and the shared memory 13 corresponding to the storage device control apparatus of the present invention. Applicants do not agree.

Yoshida teaches that each disk array control apparatus 1 is formed as a single frame (housing) and as such does not allow for each of the channel control units, the disk control units, the cache memory units, and the storage control units to be independently connected or disconnected to the storage device control apparatus as needed as in the present invention as recited in

the claims. In Yoshida each of the disk I/F 12, channel I/F 11, cache memory 14, and shared memory 13 are interconnected to one another by the interconnection networks 21, 22 and there is no teaching or suggestion that such elements can be freely coupled or decoupled to one another as in the present invention.

Thus, Yoshida fails to teach or suggest an internal connection part allows the channel control units, the disk control units, the cache memory units, and the storage control units to each be independently connected or disconnected to the storage device control apparatus in a communicable manner as recited in the claims.

Therefore, as is quite clear from the above, the features of the present invention as now more clearly recited in each of the claims are not taught or suggested by Yoshida whether taken individually or in combination with any of the other references of record. Accordingly, reconsideration and withdrawal of the 35 USC §102(e) rejection of claims 1-20 as being anticipated by Yoshida is respectfully requested.

As indicated above the present amendment adds new claims 21 and 22. New claims 21 and 22 depend from claims 1 and 5, respectively. Therefore, the same arguments present above with respect to claims 1 and 5 apply as well to new claims 21 and 22. Further, each of new claims 21 and 22 recite additional features of a mounting part not taught or suggested by Yoshida.

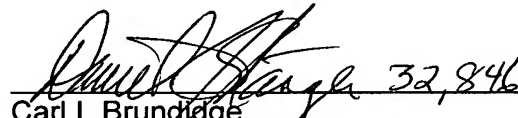
The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 1-20.

In view of the foregoing amendments and remarks, applicants submit that claims 1-22 are in condition for allowance. Accordingly, early allowance of claims 1-22 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (500.43106X00).

Respectfully submitted,

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